

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1-34. (previously canceled)

35- 54. (canceled)

55. (previously presented) A mass spectrometer comprising:

an ion source;
a lens downstream of said ion source; and
a mass analyser downstream of said lens, said mass analyser comprising an ion detector;

wherein said lens is regularly switched back and forth between a first high sensitivity mode of operation wherein said lens focuses a beam of ions and a second low sensitivity mode of operation wherein said lens substantially defocuses a beam of ions.

56. (previously presented) A mass spectrometer as claimed in claim 55, wherein said lens comprises a y-focusing lens.

57. (previously presented) A mass spectrometer as claimed in claim 55, wherein said lens comprises a z-focusing lens.

58. (previously presented) A mass spectrometer as claimed in claim 55, wherein said lens comprises an Einzel lens comprising a front, intermediate and rear electrode, with said front and rear electrodes being maintained, in use, at substantially the same DC voltage and said intermediate electrode being maintained at a different voltage to said front and rear electrodes.

59. (previously presented) A mass spectrometer as claimed in claim 58, wherein said front and rear electrodes are maintained, in use, at between -30 to -50V DC for positive ions, and said intermediate electrode is switchable from a voltage in said first high sensitivity mode of $\leq -80\text{V DC}$ to a voltage $\geq +0\text{V DC}$ in said second low sensitivity mode.

60. (previously presented) A mass spectrometer as claimed in claim 55, further comprising a power supply capable of supplying from -100 to +100V DC to said lens.

61. (previously presented) A mass spectrometer as claimed in claim 55, wherein said lens is selected from the group consisting of: (i) a stigmatic focusing lens; and (ii) a DC quadrupole lens.

62. (previously presented) A mass spectrometer as claimed in claim 55, wherein in said second low sensitivity mode a beam of ions is diverged to have a profile which substantially exceeds an entrance aperture to said mass analyser.

63. (previously presented) A mass spectrometer as claimed in claim 55, wherein, in said first high sensitivity mode, at least 85% of ions in a beam of ions are arranged to pass through an entrance aperture to said mass analyser.

64. (previously presented) A mass spectrometer as claimed in claim 55, wherein in said second low sensitivity mode less than or equal to 15% of ions in a beam of ions are arranged to pass through an entrance aperture to said mass analyser.

65. (previously presented) A mass spectrometer as claimed in claim 55, wherein, in said first high sensitivity mode, greater than 60% of ions fall within the entrance acceptance profile of said mass analyser and wherein, in said second low sensitivity mode, less than 40% of ions fall within the entrance acceptance profile of said mass analyser.

66. (previously presented) A mass spectrometer as claimed in claim 55, wherein the difference in sensitivity between said first high sensitivity mode and said second low sensitivity mode is at least $\times 10$.

67. (previously presented) A mass spectrometer as claim in claim 55, wherein said ion source is a continuous ion source.

68. (previously presented) A mass spectrometer as claimed in claim 67, wherein said ion source is selected from the group consisting of: (i) an Electron Impact ("EI") ion source; (ii) a Chemical Ionisation ("CI") ion source; and (iii) a Field Ionisation ("FI") ion source.

69. (previously presented) A mass spectrometer as claimed in claim 68, wherein said ion source is coupled to a gas chromatograph.

70. (previously presented) A mass spectrometer as claimed in claim 67, wherein said ion source is selected from the group consisting of: (i) an electrospray ion source; and (ii) an Atmospheric Pressure Chemical Ionisation ("APCI") source.

71. (previously presented) A mass spectrometer as claimed in claim 70, wherein said ion source is coupled to a liquid chromatograph.

72. (previously presented) A mass spectrometer as claimed in claim 55, wherein said mass analyser comprises a Time to Digital Converter.

73. (previously presented) A mass spectrometer as claimed in claim 55, wherein said mass analyser is selected from the group consisting: (i) a quadrupole mass analyser; (ii) a magnetic sector mass analyser; (iii) an ion trap mass analyser; (iv) a Time of Flight mass analyser; and (v) an orthogonal acceleration Time of Flight mass analyser.

74. (previously presented) A mass spectrometer as claimed in claim 55, wherein said mass spectrometer spends substantially the same amount of time in said first high sensitivity mode as in said second low sensitivity mode.

75. (previously presented) A mass spectrometer as claimed in claim 55, wherein said mass spectrometer spends substantially more time in said first high sensitivity mode than in said second low sensitivity mode.

76. (previously presented) A mass spectrometer as claimed in claim 55, wherein said lens is arranged to automatically switch between at least three different sensitivity modes.

77. (previously presented) A method of mass spectrometry comprising:

providing an ion source;

providing a lens downstream of said ion source; and

providing a mass analyser downstream of said lens, said mass analyser

comprising an ion detector; and

regularly switching back and forth said lens between a first high sensitivity mode of operation wherein said lens focuses a beam of ions and a second low sensitivity mode of operation wherein said lens substantially defocuses a beam of ions.